CLAIMS

What is claimed is:

1. An audio transducer subassembly, comprising:

a bobbin-shaped support structure subassembly having a flanged top, a base, and a core between the flanged top and base; and

wherein the base is adapted to allow a pole piece to be positioned within the core and a magnet to be positioned inside the base in contact with the pole piece.

2. The subassembly of claim 1, wherein the base includes a base opening adapted to allow the pole piece to be positioned inside the base and the core, and to allow the magnet to be positioned inside the base in contact with the pole piece.

3. The subassembly of claim 1, wherein the support structure has a predetermined support structure length and the pole piece has a length equal to the predetermined support structure length.

4. The subassembly of claim 1, wherein the pole piece is adapted so that, when positioned inside the support structure, it does not extend out of the flanged top or out of the base.

5. The subassembly of claim 1, wherein:

the pole piece includes an upper portion and a lower portion;

the core is adapted to allow the upper portion of the pole piece to be positioned within the core and to prevent the lower portion from being positioned within the core; and

the base is adapted to allow the upper portion to pass through the base and be positioned within the core and to allow the lower portion to be positioned within the base.

6. The subassembly of claim 1, wherein the core and base are adapted to receive a flanged pole piece.

7. The subassembly of claim 1, wherein the core and base are adapted to receive a t-shaped pole piece.

8. The subassembly of claim 1, further comprising:

a wire wrapped around the core to form a coil; and

an output assembly connected to the coil and mounted on the base.

9. The subassembly of claim 8, further comprising the pole piece positioned within the core and the base.

10. An audio transducer, comprising:

a magnetic assembly having only two magnetic pole pieces and adapted to generate two magnetic fields;

a coil assembly positioned within the magnetic fields and adapted to generate two signals when the magnetic fields are varied by a guitar string vibrating in the magnetic fields;

a support structure adapted to provide support for the coil and magnetic assemblies; and

wherein the two signals generated by the coil assembly can be combined together in a predetermined manner to generate an x-plane signal representative of vibrations of the guitar string in a first plane a predetermined distance from and parallel to an upper surface defined on the support structure and a y-plane signal representative of vibrations of the guitar string in a second plane a predetermined distance from the magnetic pole pieces and perpendicular to the upper surface of the support structure.

11. The audio transducer of claim 10, wherein the magnetic pole pieces have inverted polarities.

12. The audio transducer of claim 10, wherein the magnetic assembly is adapted to generate two parallel magnetic fields.

13. The audio transducer of claim 10, wherein the audio transducer is adapted to be positioned relative to the guitar string so that the two magnetic pole pieces are beneath and on opposite sides of the guitar string.

14. The audio transducer of claim 10, wherein the coil assembly is mounted on the support structure and the magnetic assembly is positioned within the support structure so that the magnetic assembly passes through the coil assembly.

15. The audio transducer of claim 14, wherein the support structure includes a support structure opening and the magnetic assembly is positioned within the support structure by inserting the magnetic assembly into the support structure through the support structure opening.

16. The audio transducer of claim 10, wherein:

the support structure includes two bobbin shaped structures and a base; and

the coil assembly is mounted on the bobbin shaped structures and the magnetic assembly is positioned within the support structure so that the magnetic assembly is positioned within each bobbin shaped structure and the base.

17. The audio transducer of claim 10, wherein:

the support structure includes two bobbin shaped support structure subassemblies adapted to provide support for the coil and magnetic assemblies; and

the coil assembly is mounted on the bobbin shaped support structure subassemblies, the magnetic assembly is positioned within each bobbin shaped support structure so that the magnetic assembly passes through the coil assembly, and the bobbin shaped support structures are held in position with respect to one another by magnetic forces generated by the magnetic assembly.

18. An audio transducer, comprising:

a magnetic assembly adapted to generate two magnetic fields;

a coil assembly positioned within the magnetic fields and adapted to generate two signals when the magnetic fields are varied by a guitar string vibrating in the magnetic fields;

a support structure having two support structure subassemblies adapted to provide support for the coil and magnetic assemblies; and

wherein

the bobbin shaped support structures are held in position with respect to one another by magnetic forces generated by the magnetic assembly; and

the two signals generated by the coil assembly can be combined together in a predetermined manner to generate an x-plane signal representative of vibrations of the guitar string in a first plane a predetermined distance from and parallel to an upper surface defined on the support structure and a y-plane signal

representative of vibrations of the guitar string in a second plane a predetermined distance from the magnetic pole pieces and perpendicular to the upper surface of the support structure.

19. The audio transducer of claim 18, wherein the magnetic assembly includes two magnetic pole pieces having inverted polarities.

20. The audio transducer of claim 19, wherein the magnetic assembly further includes a magnet in contact with each magnetic pole piece.

21. The audio transducer of claim 18, wherein the magnetic assembly is adapted to generate two parallel magnetic fields.

22. The audio transducer of claim 18, wherein the audio transducer is adapted to be positioned relative to the guitar string so that the magnetic assembly is beneath and on opposite sides of the guitar string.

23. An audio transducer for a guitar, comprising:

an electromagnetic array of individual audio transducers adapted to be mounted on a guitar, each transducer adapted to generate two analog string signals having opposite polarities for a single guitar string vibrating a predetermined distance from the audio transducer; and

the array further including a noise transducer adapted to generate an analog noise signal representative of noise in the analog string signal pairs.

24. The transducer of claim 23, wherein each audio transducer is adapted to generate each analog string signal so that it has a 95 dB signal to noise ratio.

25. The transducer of claim 23, wherein each audio transducer is adapted to generate each analog string signal pair so the pairs have a 45 dB channel separation from one another.

26. The transducer of claim 23, wherein the electromagnetic array is adapted to be mounted on a guitar bridge included as part of the guitar.

27. The transducer of claim 23, wherein each audio transducer includes a pair of electrical coils wound out of phase with one another.

28. The transducer of claim 23, wherein each noise transducer includes a noise coil.